

WHAT IS CLAIMED IS:

1. An internal osteotomy fixation device, comprising:
  - a distal plate including a channel;
  - a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface;
  - a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; and
  - a proximal plate; wherein
  - the proximal plate is hingedly connected to the slide.
2. The internal osteotomy fixation device of Claim 1, wherein the proximal plate is pivotable relative to the slide about a second axis that is substantially perpendicular to the first axis.
3. The internal osteotomy fixation device of Claim 1, wherein the distal plate further comprises a bone engaging surface, and the bone engaging surface is configured to conform to a curved bone surface.
4. The internal osteotomy fixation device of Claim 1, wherein the distal plate and the proximal plate each further comprise at least one through-hole, and each through-hole is adapted to receive a bone screw for securing the device to a patient's bone.
5. The internal osteotomy fixation device of Claim 1, wherein the slide first surface comprises a posterior surface when the device is implanted on a medial surface of a patient's tibia.
6. The internal osteotomy fixation device of Claim 5, wherein the distal plate further comprises a second channel in a posterior surface, and the ratchet arm is disposed within the second channel.
7. An internal osteotomy fixation device, comprising:
  - a distal plate including a channel;
  - a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface;

a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; and

a proximal plate; wherein

the proximal plate includes a first portion defining a first plane, and a ledge defining a second plane substantially perpendicular to the first plane.

8. The internal osteotomy fixation device of Claim 7, wherein a proximal surface of the ledge abuts a distal surface of a proximal bone segment when the device is implanted within a patient.

9. An internal osteotomy fixation device, comprising:

a distal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface; and

a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; wherein

the slide includes a first portion defining a first plane, and a ledge defining a second plane substantially perpendicular to the first plane.

10. The internal osteotomy fixation device of Claim 9, wherein a proximal surface of the ledge abuts a distal surface of a proximal bone segment when the device is implanted within a patient.

11. An internal osteotomy fixation device, comprising:

a distal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface; and

a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; wherein

a cross-sectional area of the ratchet arm decreases from a distal end of the ratchet arm toward a proximal end of the ratchet arm.

12. The internal osteotomy fixation device of Claim 11, wherein the ratchet arm is configured to maintain a constant stress level along a flexed portion of the ratchet arm.

13. The internal osteotomy fixation device of Claim 11, wherein the ratchet arm is fixed to the distal plate in a cantilevered fashion.

14. The internal osteotomy fixation device of Claim 11, further comprising a proximal plate.

15. The internal osteotomy fixation device of Claim 14, wherein the proximal plate is hingedly connected to the slide.

16. An internal osteotomy fixation device, comprising:

a distal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface; and

a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; wherein

the distal plate includes a first surface comprising a shelf, the shelf facing a proximal end of the device; and

the ratchet arm includes a second surface, the second surface facing a distal end of the device, and the second surface abuts the shelf.

17. The internal osteotomy fixation device of Claim 16, wherein the second surface transmits compressive loads experienced by the device to the distal plate.

18. The internal osteotomy fixation device of Claim 17, wherein the ratchet arm further comprises an oval-shaped through hole in a distal portion, and a major axis of the oval is aligned with the first axis.

19. The internal osteotomy fixation device of Claim 16, further comprising a proximal plate.

20. The internal osteotomy fixation device of Claim 19, wherein the proximal plate is hingedly connected to the slide.

21. An internal osteotomy fixation device, comprising:

a distal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having a segment of ratchet teeth on a first surface, the segment having a first length; and

a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth, the ratchet arm having a second length; wherein

in a completely retracted configuration, the segment overlaps the ratchet arm such that an overall length of the device is dependent upon the longer of the first length or the second length.

22. The internal osteotomy fixation device of Claim 21, further comprising a proximal plate.

23. The internal osteotomy fixation device of Claim 22, wherein the proximal plate is hingedly connected to the slide.

24. An internal osteotomy fixation device, comprising:

a distal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface;

a ratchet arm fixed to the distal plate in a cantilevered fashion, the ratchet arm including teeth configured to engage the slide ratchet teeth; and

the distal plate further comprises a through-hole, and a release tool is insertable within the through-hole to engage the ratchet arm.

25. The internal osteotomy fixation device of Claim 24, wherein rotation of the release tool within the through-hole flexes the ratchet arm and disengages the ratchet arm teeth from the slide teeth.

26. The internal osteotomy fixation device of Claim 24, wherein the distal plate further comprises a beveled portion surrounding a medial side of the through-hole, and the beveled portion is configured to guide the release tool toward the through-hole.

27. The internal osteotomy fixation device of Claim 24, further comprising a proximal plate.

28. The internal osteotomy fixation device of Claim 27, wherein the proximal plate is hingedly connected to the slide.

29. An internal osteotomy fixation device, comprising:

a distal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the distal plate along a first axis, the slide having ratchet teeth on a first surface; and

a ratchet arm fixed to the distal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; wherein

the ratchet arm is fixed to a posterior portion of the distal plate.

30. The internal osteotomy fixation device of Claim 29, further comprising a proximal plate.

31. The internal osteotomy fixation device of Claim 30, wherein the proximal plate is hingedly connected to the slide.

32. An internal osteotomy fixation device, comprising:

a proximal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the proximal plate along a first axis, the slide having ratchet teeth on a first surface;

a ratchet arm fixed to the proximal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; and

a distal plate; wherein

the distal plate is hingedly connected to the slide.

33. An internal osteotomy fixation device, comprising:

a proximal plate including a channel;

a slide slidably received within the channel such that the slide is translatable with respect to the proximal plate along a first axis, the slide having ratchet teeth on a first surface; and

a ratchet arm fixed to the proximal plate, the ratchet arm including teeth configured to engage the slide ratchet teeth; wherein

a cross-sectional area of the ratchet arm decreases from a proximal end of the ratchet arm toward a distal end of the ratchet arm.

34. The internal osteotomy fixation device of Claim 33, wherein the ratchet arm is configured to maintain a constant stress level along a flexed portion of the ratchet arm.

35. The internal osteotomy fixation device of Claim 33, further comprising a distal plate.

36. The internal osteotomy fixation device of Claim 35, wherein the distal plate is hingedly connected to the slide.